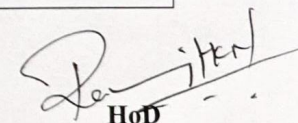# Maharaja Institute of Technology Thandavapura
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Department of Computer Science and Engineering

Content Beyond the Syllabus

Sl. No.	Subject & Code	Semester & Year	Course Coordinator	Resource Person	Topic	Date
1	Artificial Intelligence and Machine learning[18CS71]	7th Sem, 2023-24 [ODD]	Prof. Suhasini	Prof Madan Kumar G S	Dimensionality Reduction Techniques.	06/01/2024
2	User Interface Design [18CS734]	7th Sem, 2023-24 [ODD]	Prof. Suma H C	Dr. Swarnalatha K	Creating Meaningfull graphics, icons and images.	05/01/2024
3	Digital Image Processing [18CS741]	7th Sem, 2023-24 [ODD]	Dr. H K Chethan	Dr. Srinivasa M G	Morphological Operations	06/01/2024
4	Artificial Intelligence and Machine learning[18CS71]	7th Sem, 2022-23 [ODD]	Prof. Suhasini	Prof Madan Kumar G S	Deep Learning Concept	28/12/2022
5	User Interface Design [18CS734]	7th Sem, 2022-23 [ODD]	Prof. Bharath Bharadwaj B S	Dr. Swarnalatha K	Organize and Layout Windows and Pages	29/09/2022
6	Digital Image Processing [18CS741]	7th Sem, 2022-23 [ODD]	Dr. Ranjit K N	Dr. Srinivasa M G	Digital Video Compression	28/12/2022
7	Management and Entrepreneurship [18CS51]	5th Sem, 2022-23 [ODD]	Prof. Arpitha K	Prof. Ramesha K	How a country can overcome from a financial crisis	26/01/2023
8	Computer Networks and Security [18CS52]	5th Sem, 2022-23 [ODD]	Prof. Ashwini G	Prof. Ravikumar R	Cyber Laws and it Act 2000	25/01/2023
9	Microcontroller and Embedded Systems [21CS43]	4th Sem, 2022-23 [EVEN]	Prof. Sowmyashree A N	Prof. Bhagyalakshmi V	Microprocessors, Application and Domain Specific Embedded Systems.	25/09/2023
10	Operating System [21CS44]	4th Sem, 2022-23 [EVEN]	Dr. Ranjit K N	Prof. Gagana M S	MAC OS	25/09/2023

HoD
HEAD OF THE DEPARTMENT
Department Of Computer Science & Engineering
Maharaja Institute Of Technology Thandavapura
Mysuru

Maharaja Institute of Technology Thandavapura
(Approved by AICTE, New Delhi and Affiliated to VTU, Belagavi)
Department of Computer Science and Engineering

MITT/CSE/CBS/2023-24/ 07_____   Date: 01/01/2024

From,

Dr H K Chethan,
Professor,
Department of Computer Science & Engineering,
Maharaja Institute of Technology Thandavapura.

Through,

HoD, Dept. Of CS&E, MITT.

To,

Principal,
Maharaja Institute of Technology Thandavapura.

Respected Sir/Madam,

Sub: - Request to handle lecture session on "Digital Image Processing (DIP)"

Greetings, with reference to above subject, we are planning to conduct the "Content beyond the Syllabus" in "Digital Image Processing" for Seventh semester Computer Science and Engineering students on 6th of January 2024. Teaching beyond the syllabus strengthens and expands student's existing knowledge, adds interest to the course and give learners a lot of exposure to the course. Henceforth, I request your kind self to oblige and support the department for the smooth conduction of the class.

Thanks and Regards,

Dr. H K Chethan,
Professor,
Department of Computer Science & Engineering,
Maharaja Institute of Technology Thandavapura

Remarks	Permitted	Signature

MITT/CSE/CBS/2023-24/___   Date: 02/01/2024

Invitation

From,

Dr H K Chethan,
Professor,
Department of Computer Science & Engineering,
Maharaja Institute of Technology Thandavapura.

Through,

HoD, Dept. of CS&E, MITT.

To,

Dr Srinivasa M G

Associate Professor and Head

Department of Electronics and Communication Engineering

Maharaja Institute of Technology Thandavapura

Respected Sir,

Sub: - Request to handle lecture session on "Digital Image Processing (DIP)"

Greetings, with reference to above subject, we are planning to conduct the "Content beyond the Syllabus" in "Digital Image Processing" for Seventh semester Computer Science and Engineering students on 6th of January 2024. We have taken permission from principal and same as been conveyed to your Dept. of HOD. Hence I hereby request you to confirm the dates mentioned.

I hope you will do the needful and oblige.

Thank You.

Accepted
M.G. Srinivasa 2/1/2024

Yours Sincerely,

Dr Ranjit K N,
Associate Professor and Head,
Department of Computer Science and Engineering,
Maharaja Institute of Technology Thandavapura.

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(Approved by AICTE, New Delhi and Affiliated to VTU, Belagavi)
Department of Computer Science and Engineering

MITT/CSE/CBS/2023-24/___   Date: - 06/01/2024

LETTER OF APPRECIATION

Dear Dr Srinivasa M G,

This is to extend our sincere gratitude for your participation as a resource person to deliver lecture on "Digital Image Processing" held on 06/01/2024 which is conducted by Department of Computer Science and Engineering, Maharaja Institute of Technology Thandavapura

We would like to appreciate your valuable presence and great effort in sharing your knowledge and experiences with the Fourth semester of CSE students.

Yours lecturing session of "Content beyond the syllabus" on "Digital Image Processing" was very informative. The depth of your knowledge on the subject and the clarity with which you conveyed concepts left a lasting impression on our students. Your ability to engage and captivate the students throughout the session was commendable.

Thank you for sharing your expertise, time, and wisdom with us. We are immensely grateful for your valuable contribution.

Wishing you continued success in all your endeavours.

Sincerely,

Dr Ranjit K N,

Associate Professor and Head,

Department of Computer Science and Engineering,

Maharaja Institute of Technology Thandavapura.

Maharaja Institute of Technology Thandavapura

NH766, Nanjangud Taluk, Mysuru–571302

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Department of Computer Science and Engineering

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REPORT ON

"Digital Image Processing"

CONDUCTED ON

06/01/2024

Maharaja Institute of Technology Thandavapura
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Department of Computer Science and Engineering

Report On	Content Beyond the syllabus		
Sem and Year	7th sem, 2023-24[ODD]	Date	06/01/2024
Subject & code	DIP [18CS741]	Coordinator	Dr. H K Chethan
Resource Person	Dr. Srinivasa M G	Topic	Morphological operation

A Lecture session was organized for the students of VII Semester, Department of Computer Science and Engineering, Maharaja Institute of Technology, Thandavapura on the Course "Digital Image Processing" in order to strengthen and expands students existing knowledge and creating interest to the course. The lecture session was delivered by Dr. Srinivasa M G, Assoc. Prof and HOD, Department of ECE to give brief insights about the operating system indispensable role in the world of modern computing.

Thefollowingtopics were discussed:

Morphological image processing (MIP) is a group of non-linear operations that correlate to the shape or morphology of features in an image. The morphological operations depend only on the comparative arrangement of pixel values, not their numerical values. They are particularly suitable for processing binary images.
Greyscale images also benefit from morphological operations because their optical transfer functions are unknown, and their absolute pixel values are of little or no interest.
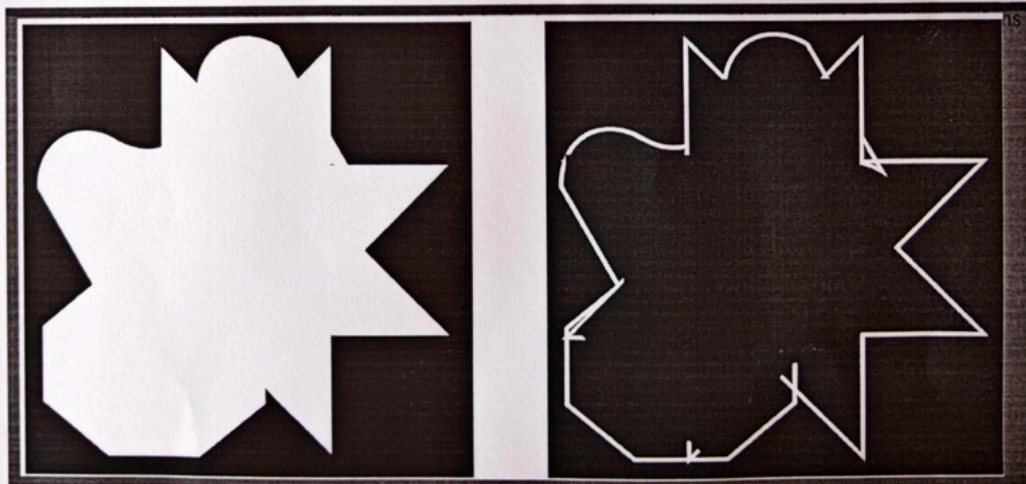

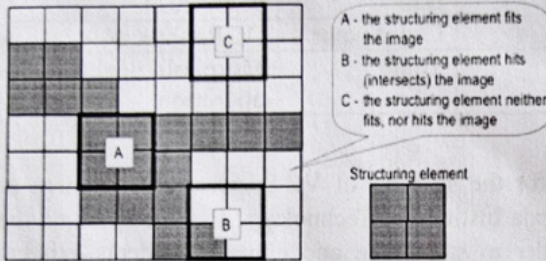Fig: Boundary extraction using morphological image processing operations

The structuring element:
A **structuring element** is a small shape or template that morphological techniques use to examine an image. These techniques examine all possible locations of the structuring element in the image, and compared them to the corresponding pixel neighbourhood.
Fit: When all of the structuring element's pixels completely encircle the target object's pixels
Hit: When at least one structural element's pixels overlap an object's pixels

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Miss: When the object's pixels are not covered by any pixels in the structuring element

Some tests see if an object "fits" into its surroundings, while others look for instances where it "hits" or intersects the surroundings.

Types of morphological operations:
The structuring element's size and shape help us determine how many pixels are added to or subtracted from the object in the image. We define the morphological operation as **dilatation** or **erosion** by the rule that processes the pixels.

Dilation: In the dilation process, we add pixels to the bounded objects.
Erosion: In the erosion process, we remove pixels from the edges of objects.

Dilation
The highest value of all the pixels in the vicinity makes up the output pixel's value. A pixel in a binary image is set to 1 if adjacent pixels have a value of 1.
Morphological dilation fills up small gaps in objects and increases object visibility. Shapes with filling appear more prominent, and lines appear thicker.
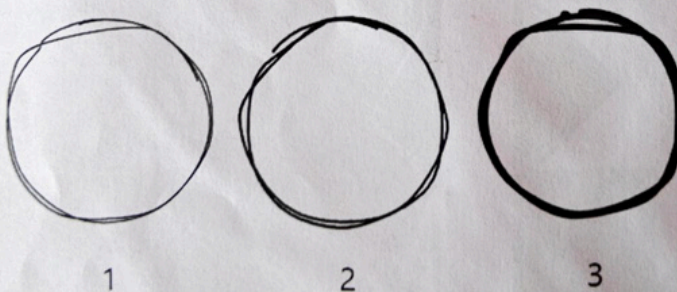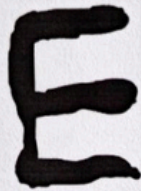

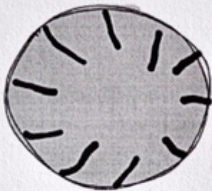Fig: Results of structuring element size in dilation(1-3)

Some important properties of dilation are as follows:
- It can mend damages.
- It can correct encroachments.

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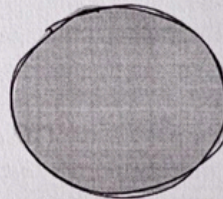COMPUTER SCIENCE AND ENGINEERING

Properties of dilation
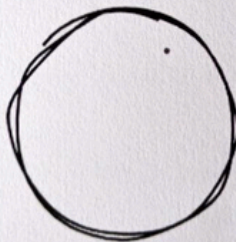

Repairing breaks

Repairing intrusions

Erosion

The lowest value of all the neighborhood pixels makes up the output pixel's value. A pixel in a binary image is set to 0 if its neighbors also have a value of 0.
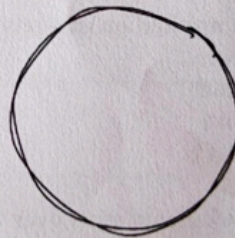
Floating pixels and thin lines are eliminated through morphological erosion, leaving only substantial objects.
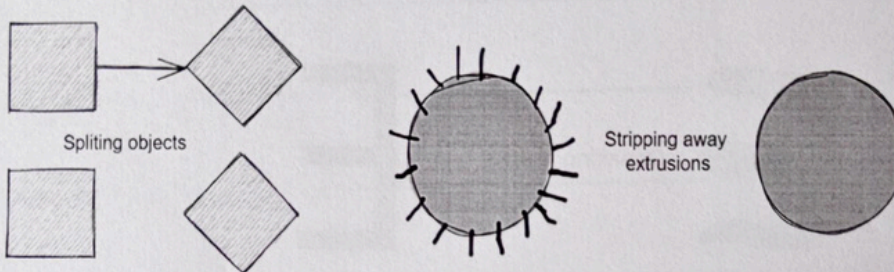

1   2   3

Fig: Results of structuring element size in erosion(1-3)

Some important properties of erosion are as follows:

- It can disassemble joint objects.
- It can remove extrusions.

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Properties of erosion

Spliting objects

Stripping away extrusions

Use cases

A few use cases of morphological image processing are as follows:

- Dilation broadens items and fills in tiny gaps in the object.
- Small items are eliminated by erosion, leaving only actual objects.
- We can find the perimeter of objects in the binary image.
- It reduces all objects to lines in a 2-D binary image or 3-D binary volume.
- It helps us suppress light structures connected to the image border.

Quiz:

1. **(A.B).B is equal to With dilation process images get**
   a. **A.B**
   b. A+B
   c. A o B
   d. AxB

2. **Reflection is applied on image's**
   a. x coordinate
   b. y coordinate
   c. z coordinate
   d. **Both a and b**

3. **Structuring elements runs over image's**
   a. rows
   b. columns
   c. edges
   d. **every element**

4. **Dilation followed by erosion is called**
   a. opening
   b. **closing**
   c. blurring
   d. translation

5. **Reflection and translation of the image objects are based on**
   a. Pixels
   b. frames
   c. **structuring elements**
   d. coordinates

6. **Opening smooths, the image's**
   a. Pixels
   b. lines
   c. **contour**
   d. boundary

7. **Two main operations of morphology are**
   a. Erosion
   b. Dilation
   c. Set theory
   d. **Both a and b**

8. **Structuring elements have origins at**
   a. Top left
   b. top right
   c. **center**
   d. bottom left

9. **With dilation process images get**
   a. Thinner
   b. shrinked
   c. **thickened**
   d. sharpened

10. **Opening and closing are each others**
    a. Neighbors
    b. **duals**
    c. centers
    d. corners

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Photos: Dr. Srinivas M G sir lecture on Morphological Operations.

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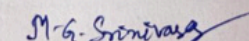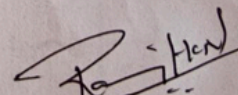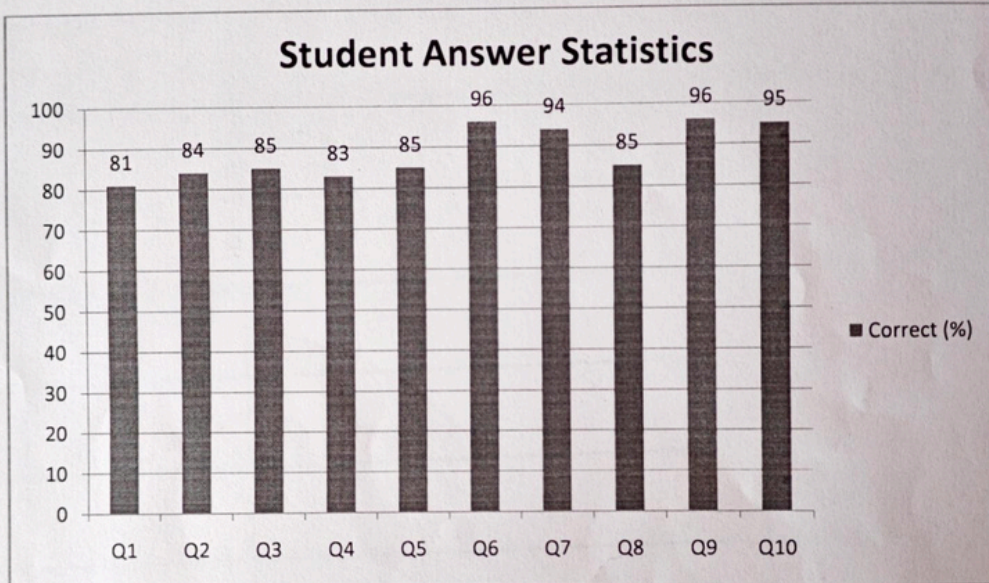## Department of Computer Science and Engineering
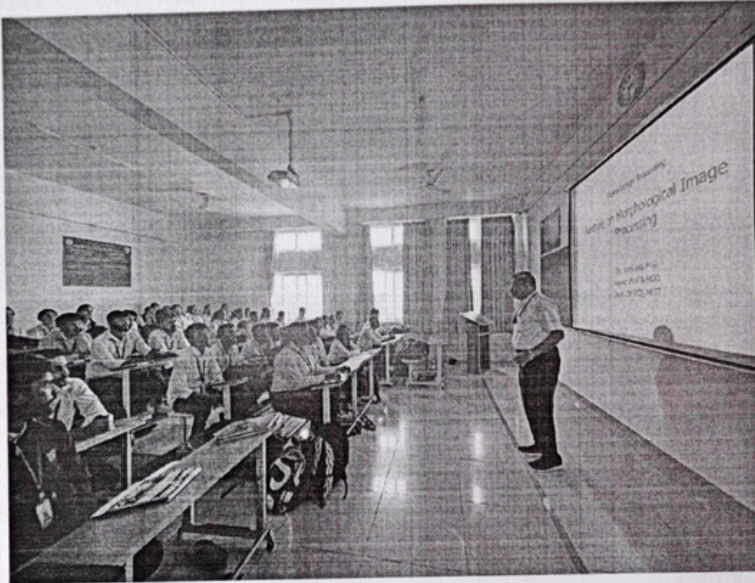
Impact Analysis

The event was proposed and conducted for the better learning of the students. The impact of conducting the event indicates the improvement in the learning curve of the students. The students exhibits promising results. The glimpse of improvement in their performance is exhibited through the quiz questionnaire results.

Student Answer Statistics

Question	Correct (%)
Q1	81
Q2	84
Q3	85
Q4	83
Q5	85
Q6	96
Q7	94
Q8	85
Q9	96
Q10	95

Sub Coordinator

Resource person
M-G-Srinivas

HoD